APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,776	11/26/2003	Haixun Wang	YOR920030413US1	7238

48062 7590 04/16/2007 RYAN, MASON & LEWIS, LLP 1300 POST ROAD SUITE 205 FAIRFIELD, CT 06824	**EXAMINER** BITAR, NANCY

ART UNIT	PAPER NUMBER
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/722,776	WANG ET AL.
	Examiner	Art Unit	
	Nancy Bitar	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>26 November 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final..

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) <u>1-20</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>14 June 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-SB/08) Paper No(s)/Mail Date <u>06/14/2004</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Examiner Notes

1.   Examiner cites particular columns and line numbers in the references as

applied to the claims below for the convenience of the applicant. Although the

specified citations are representative of the teachings in the art and are applied

to the specific limitations within the individual claim, other passages and figures

may apply as well. It is respectfully requested that, in preparing responses, the

applicant fully consider the references in entirety as potentially teaching all or

part of the claimed invention, as well as the context of the passage as taught by

the prior art or disclosed by the examiner

Claim Rejections - 35 USC § 101

2.   Claims 1- 20 are rejected under 35 U.S.C. 101 because the claimed

invention is directed to non-statutory subject matter as follows.

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or
composition of matter, or any new and useful improvement thereof, may obtain a patent
therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for
Patent Subject Matter Eligibility" (Official Gazette notice of 22 November
2005), Section IV.C, reads as follows:

Nonfunctional descriptive material that does not constitute a statutory process, machine,
manufacture or composition of matter and should be rejected under 35 U.S.C. Sec. 101.
Certain types of descriptive material, such as music, literature, art, photographs and mere
arrangements or compilations of facts or data, without any functional interrelationship is not a
process, machine, manufacture or composition of matter. USPTO personnel should be
prudent in applying the foregoing guidance. Nonfunctional descriptive material may be
claimed in combination with other functional descriptive multi-media material on a computer-
readable medium to provide the necessary functional and structural interrelationship to satisfy

the requirements of 35 U.S.C. Sec. 101. The presence of the claimed nonfunctional descriptive material is not necessarily determinative of nonstatutory subject matter. For example, a computer that recognizes a particular grouping of musical notes read from memory and upon recognizing that particular sequence, causes another defined series of notes to be played, defines a functional interrelationship among that data and the computing processes performed when utilizing that data, and as such is statutory because it implements a statutory process.

While abstract ideas, natural phenomena, and laws of nature are not eligible for patenting, methods and products employing abstract ideas, natural phenomena, and laws of nature to perform a real-world function may well be. In evaluating whether a claim meets the requirements of section 101, the claim must be considered as a whole to determine whether it is for a particular application of an abstract idea, natural phenomenon, or law of nature, rather than for the abstract idea, natural phenomenon, or law of nature itself.

For claims including such excluded subject matter to be eligible, the claim must be for a practical application of the abstract idea, law of nature, or natural phenomenon. Diehr, 450 U.S. at 187, 209 USPQ at 8 ("application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."); Benson, 409 U.S. at 71, 175 USPQ at 676 (rejecting formula claim because it "has no substantial practical application").

To satisfy section 101 requirements, the claim must be for a practical application of the Sec. 101 judicial exception, which can be identified in various ways:

> The claimed invention "transforms" an article or physical object to a different state or thing.

> The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

3.   Claim 20 recites functional descriptive material on a machine-readable medium. However, the program/algorithm itself merely manipulates data or an abstract idea, or merely solves a mathematical problem without a limitation to a practical application.   A practical application exists if the _result_ of the claimed invention is "useful, concrete and tangible" (with the emphasis on "result")(Guidelines, section IV.C.2.b).   A "useful" result is one that satisfies the utility requirement of section 101, a "concrete" result is one that is "repeatable" or "predictable", and a "tangible" result is one that is "real", or "real-world", as opposed to "abstract" (Guidelines, section IV.C.2.b)). Claim 20 merely

manipulates data without ever producing a useful, concrete and tangible result (see page 52-54 of Interim Guideline).

In order to for the claimed product to produce a "useful, concrete and tangible" result, recitation of one or more of the following elements is suggested:

- The manipulation of data that represents a physical object or activity transformed from outside the computer.

- A physical transformations outside the computer, for example in the form of pre or post computer processing activity.

- A direct recitation of a practical application;

Applicant is also advised to provide a written explanation of how and why the claimed invention (either as currently recited or as amended) produces a useful, concrete and tangible result. Moreover, claim 20 defines " an article of manufacture containing one or more programs " embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed " am machine readable medium containing one or more programs " can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium

encoded with one or more computer program" or equivalent in order to make the claim statutory.

4.   Claim 19 recites an apparatus for finding near-neighbors in a set of objects, by identify subspace pattern similarities that the objects in the set exhibit in multi-dimensional spaces; and define subspace correlations between two or more of the objects in the set based on the identified subspace pattern similarities for use in identifying near-neighbor objects which does not impart functionality to a computer or computing device, and is thus considered nonfunctional descriptive material. Such nonfunctional descriptive material, in the absence of a functional interrelationship with a computer, does not constitute a statutory process, machine, manufacture or composition of matter and is thus non-statutory per se. Even though the claim recites a seemingly statutory apparatus (that is a computer with memory and a processor), the claim in reality provides patent protection for every substantial practical application of the mathematical algorithm itself thus it is non-statutory.

5.   Claims 1 and 18 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows.   Claim 1 and 18 recites functional descriptive material for a method. However, the algorithm itself merely manipulates data or an abstract idea, or merely solves a mathematical problem without a limitation to a practical application.   A practical application exists if the _result_ of the claimed invention is "useful, concrete and tangible" (with the emphasis on "result")(Guidelines, section IV.C.2.b).   A "useful" result is one that satisfies the utility requirement of section 101, a "concrete" result is one that

is "repeatable" or "predictable", and a "tangible" result is one that is "real", or

"real-world", as opposed to "abstract" (Guidelines, section IV.C.2.b)). Since

claims 1 and 18 merely manipulates data without ever producing a useful,

concrete and tangible result thus it is non-statutory. Claims 2-17 are variously

dependent from claim 1 and are thus similarly non-statutory.

Claim Rejections - 35 USC § 102

(b) The invention was patented or described in a printed publication in this or a foreign country or in
public use or on sale in this country, more than one year prior to the date of application for patent in
the United States.

6.   Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by

Wang et al (Clustering by Pattern Similarity in Large data Sets, ACM SIGMOD'

2002 June 4-6, Madison Wisconsin, USA).

As to claim 1, teaches a method for use in finding near-neighbors in a set

of objects comprising the steps of: identifying subspace pattern similarities that

the objects in the set exhibit in multi-dimensional spaces (identifying subspace

clusters in high-dimensional data sets, section 1.3); and defining subspace

correlations between two or more of the objects in the set based on the identified

subspace pattern similarities for use in identifying near-neighbor objects. Wang

discloses clustering by pattern similarity in large data sets (see abstract),

including the further limitation wherein the distance function -comprises the

following: given two data objects x an d y, a subspace S, and a dimension $k \in S$,

the sequence-based distance between x and y is as follows: 7 dist k, S (x, y)

=max i € S (xi-yi)- (xk - yk) (see section 4.1: Pairwise Clustering, column 2, lines

1-7; in order to increase the efficiency of determining the pattern similarity)

As to claims 2, Wang et al. teaches the method of claim 1, wherein the

identifying step further comprises the step of creating a pattern distance index

(Euclidean distance, section 1.1).

As to claim 3, Wang et al. teaches the method of claim 1, wherein the

multi-dimensional spaces comprise arbitrary spaces (figures 1 and 2).

As to claims 4- 5, Wang et al. teaches the method of claim 4, wherein the

subspace dimensionality is an indicator of a degree of similarity between the

objects (section 4.1).

As to claim 6, Wang et al. teaches the method of claim 1, wherein data

relating to the objects is static (there is no coherence need to be related by

shifting or scaling the objects, section 1.4).

As to claim 8, Wang et al. teaches the method of claim 1, wherein data

relating to the objects comprises gene expression data (the gene expression

data are organized as matrices, section 1.2).

As to claims 7 and 9, Wang et al. teaches the method of claim 1, wherein

data relating to the objects comprises synthetic data and dynamic data (synthetic

and real life data sets, section 5).

As to claim 10,Wang et al. teaches the method of claim 1, wherein identifying the subspace pattern similarities comprises a comparison of any subset of dimensions in the multi-dimensional spaces (note that the algorithm finds dense cells in the lower dimensional spaces and merge them to form clusters in high dimensional spaces, section 2).

As to claim 11, Wang et al. teaches the method of claim 1, wherein identifying the subspace pattern similarities comprises an ordering of dimensions in the multi-dimensional spaces (section 4.1, $S (x, y, 7\text{-}) = \{dxa - dya \mid a \in T\}$)

. As to claims 12- 13,Wang et al. teaches the method of claim 12, wherein a first pair in the sequence of pairs comprises a base of comparison for one or more remaining pairs in the sequence of pairs (figure 13).

As to claim 14, Wang et al. teaches the method of claim 12, wherein the sequence of pairs is represented sequentially in a tree structure comprising one or more edges and one or more nodes (section 4.3: Main algorithm and figure 10).

As to claim 15, Wang et al. teaches the method of claim 2, wherein creating the pattern distance index comprises use of pattern-distance links (figure 9-10).

As to claim 16, Wang et al. teaches the method of claim 1, wherein the process is optimized by maintaining a set of embedded ranges (embed random value ranges from 0-500, section 5.1).

As to claim 17, Wang et al. teaches the method of claim 1, wherein the subspace correlations comprise a distance between two or more of the objects in the set   (objects based on their distances which are measured by distance function e.g. Euclidean; section 6).

The limitation of claim 18 has been addressed above except for the following:" performing a near neighbor search". Wang et al teaches that limitation in section 6 where he explains that nearest neighbor search is based on value similarity.

Claims 19-20 differ from claim 1 only in that claims 19-20 are program claims whereas, claim 1 is an apparatus claim. Thus, claims 19-20 are analyzed as previously discussed with respect to claim Y above.

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Zhang et al (US 5,832,182) is cited to teach Multi-dimensional non metric data contained in very large databases is efficiently and accurately clustered to determine patterns therein and extract useful information from such patterns

Agrafiotis et al (US 6,453,246) is cited to teach representing precise or imprecise measurements of similarity/dissimilarity (relationships) between objects

as distances between points in a multi-dimensional space that represents the

objects.

Inquiries

8.   Any inquiry concerning this communication or earlier communications from

the examiner should be directed to Nancy Bitar whose telephone number is 571-

270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to

5:00pm).

        If attempts to reach the examiner by telephone are unsuccessful, the

examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The

fax phone number for the organization where this application or proceeding is

assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nancy Bitar   4/3/07

JOSEPH MANCUSO
SUPERVISORY PATENT EXAMINER